CODE: A1EC405T	R23	H.T.No:										

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

B.Tech II Year II Semester Regular Examinations May 2025

Subject Name: **ANALOG AND DIGITAL COMMUNICATIONS**

Branch: ECE

Time: 3 Hours **SET-2** **Max. Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	Define modulation. Give its advantages.	2M	CO1	BTL2
	b	The maximum frequency deviation in an FM is 10KHz and the signal frequency is 10KHz. Estimate the bandwidth using Carson's rule and the modulation index.	2M	CO1	BTL3
	c	What are different types of noise?	2M	CO2	BTL1
	d	Define sensitivity and selectivity of receiver.	2M	CO2	BTL2
	e	What is orthonormal signal space.	2M	CO3	BTL1
	f	Define MAP and ML decoding.	2M	CO3	BTL2
	g	Explain signal space representation.	2M	CO4	BTL2
	h	What is correlation receiver.	2M	CO4	BTL1
	i	Evaluate the error probability of DPSK.	2M	CO5	BTL2
	j	Illustrate the signal space diagram for QAM signal for M=8	2M	CO5	BTL1
PART-B					
UNIT-I					
2	a	Explain with diagrams, the generation of AM. Derive its efficiency.	5M	CO1	BTL2
	b	A 25MHz carrier is modulated by a 400Hz audio sine wave. If the carrier voltage is 4V and the maximum frequency deviation is 10kHz & phase deviation is 25radians. Detect the equation of this modulated wave for FM and PM. If the modulating frequency is now changed to 2kHz, all else remaining constant. Write a new equation for FM & PM.	5M	CO1	BTL3
OR					
3		Explain with neat diagram the pre-emphasis and de-emphasis circuits in frequency modulation.	10	CO2	BTL3
UNIT-II					
4	a	State and prove sampling theorem with neat diagram and mathematical approach.	5M	CO2	BTL3
	b	Explain how PPM can be generated from PWM signal.	5M	CO2	BTL2
OR					

5	a	Explain the noise performance of FM system.	5M	CO2	BTL2
	b	Explain DM transmitter and receiver. Also explain slope over load distortion.	5M	CO2	BTL2
UNIT-III					
6	a	Draw the block diagram of duo binary signaling scheme with precoder.	5M	CO3	BTL4
	b	Briefly explain the concept of eye pattern.	5M	CO3	BTL3
OR					
7	a	What is ISI? How this can be minimized?	5M	CO3	BTL1
	b	Explain operation of QAM transmitter and receiver with neat block diagram.	5M	CO3	BTL2
UNIT-IV					
8	a	Describe the conversion of the continuous AWGN channel into a vector channel.	5M	CO4	BTL4
	b	Explain with neat block diagram the structure and behavior of matched filter receiver.	5M	CO4	BTL2
OR					
9	a	Explain about coherent detection of signals in noise.	5M	CO4	BTL2
	b	Write a brief note on geometric representation of signals.	5M	CO4	BTL2
UNIT-V					
10	a	Compare the transmission, power, bandwidth and bit error parameters of various digital modulation schemes.	5M	CO5	BTL3
	b	With block diagram, explain the generation and detection of DPSK.	5M	CO5	BTL2
OR					
11		With constellation diagram, explain the QAM transmitter. Also derive it power spectral density.	10M	CO5	BTL3

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CODE: A1HS407	R23	H.T.No:									

SET-2

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

B.Tech II Year II Semester Regular Examinations May 2025

Subject Name: **DESIGN THINKING FOR INNOVATION**

Branch: ECE

Time: 3 Hours **Max. Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	Compare **symmetrical** and **asymmetrical** balance in design.	2M	CO1	L3
	b	Define the term *design element*.	2M	CO1	L1
	c	Define the ideation phase in design thinking.	2M	CO2	L1
	d	Define customer journey map.	2M	CO2	L1
	e	What is meant by the "art of innovation"?	2M	CO3	L2
	f	Mention one characteristic of a high-performing innovation team.	2M	CO3	L1
	g	List two common types of product strategies used by companies.	2M	CO4	L1
	h	Why is problem definition important before beginning the product design process?	2M	CO4	L2
	i	What is the role of design thinking in strategic business innovation?	2M	CO5	L2
	j	State one way design thinking supports corporate innovation.	2M	CO5	L1
PART-B					
UNIT-I					
2	a	Explain the stages of the Design Thinking process and their significance in solving real-world problems.	5M	CO1	L4
	b	Explain the major elements of design and their role in visual communication.	5M	CO1	L3
OR					
3	a	Evaluate the advantages and limitations of using new materials such as smart textiles, bioplastics, or carbon fiber in industrial design.	5M	CO1	L3
	b	Analyze the impact of combining lines and shapes to create complex design forms. Support your answer with real-world examples.	5M	CO1	L3
UNIT-II					
4	a	Discuss the importance of the “Empathize” stage in developing user-centered products or solutions.	5M	CO2	L3
	b	Evaluate the role of design thinking in driving social innovation through community involvement and empathy.	5M	CO2	L4
OR					
5	a	Describe how the prototyping phase helps in refining ideas and solving user problems effectively. Include at least one example.	5M	CO2	L3

	b	Create a simple design thinking framework to invent a low-cost solution for a common household problem.	5M	CO2	L5
UNIT-III					
6	a	Explain the concept of the "Art of Innovation" and discuss its significance in modern industries with examples.	5M	CO3	L3
	b	Explain any two methods for measuring the impact and value of creativity in an organization. Provide relevant examples.	5M	CO3	L3
OR					
7	a	Differentiate between creativity and innovation. Illustrate with examples how creativity can lead to innovation.: *Analysis*	5M	CO3	L4
	b	Discuss why it is important to measure creativity and how such evaluation benefits long-term organizational planning.	5M	CO3	L6
UNIT-IV					
8	a	Discuss the key objectives of product design and explain how it influences the success of a product in the market.	5M	CO4	L2
	b	Illustrate how innovation contributes to product design by citing examples of recent innovative products. What impact does innovation have on user satisfaction?	5M	CO4	L3
OR					
9	a	Explain the process of problem formation in product design. Why is it considered a crucial first step in the design process?	5M	CO4	L3
	b	Define product specifications and explain their role in guiding the product development process. Provide relevant examples.	5M	CO4	L3
UNIT-V					
10	a	Explain how design thinking contributes to strategic business innovation. Illustrate your answer with a real-world example.	5M	CO5	L3
	b	Prepare a basic plan to market your own product using design thinking principles. Include key steps and user-centered strategies.	5M	CO5	L3
OR					
11	a	Identify corporate needs that design thinking addresses and explain how it fosters innovation and adaptability in large organizations.	5M	CO5	L4
	b	What are the steps involved in developing and testing prototypes using design thinking? Explain their importance in product development.	5M	CO5	L3

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CODE: A1EC404T	R23	H.T.No:									

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

SET-1

B.Tech II Year II Semester Regular Examinations May 2025

Subject Name: **ELECTRONIC CIRCUITS ANALYSIS**

Branch: ECE

Time: 3 Hours **Max. Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	Define the term "coupling factor" in the context of multistage amplifiers	2M	CO1	BTL1
	b	Suggest one method to improve the CMRR of a basic differential amplifier.	2M	CO1	BTL2
	c	List the internal capacitances present in a MOSFET at high frequencies	2M	CO2	BTL1
	d	What is the effect of coupling capacitors on the low-frequency response of a CE amplifier?	2M	CO2	BTL2
	e	List two types of LC oscillators.	2M	CO3	BTL1
	f	What is voltage series feedback?	2M	CO3	BTL1
	g	Define power amplifier	2M	CO4	BTL1
	h	Differentiate between Class A and Class B amplifiers.	2M	CO4	BTL1
	i	What is the equation of Q factor	2M	CO5	BTL1
	j	Among Bistable, Monostable, Astable Multivibrators which multivibrator is more useful	2M	CO5	BTL2
PART-B					
UNIT-I					
2	a	Explain the working principle of a Darlington pair. Derive an expression for its overall current gain.	10M	CO1	BTL3
OR					
3	a	Describe the operation of an RC-coupled BJT amplifier with a neat circuit diagram. Discuss its frequency response characteristics	10M	CO1	BTL1
UNIT-II					
4	a	Derive the expression for the high-frequency gain of a Common Emitter (CE) amplifier considering the Miller effect	10M	CO2	BTL3
OR					
5	a	Analyze the high-frequency response of an emitter follower (Common Collector) amplifier. Discuss its advantages at high frequencies	10M	CO2	BTL4
UNIT-III					
6	a	Explain the general structure of a feedback amplifier and discuss the effects of negative feedback on gain, bandwidth, input impedance, and output impedance.	10M	CO3	BTL2

		OR			
7	a	Describe the four basic feedback topologies with circuit diagrams and identify how they affect the input and output impedance of the amplifier.	10M	CO3	BTL2
		UNIT-IV			
8	a	Draw and explain a CMOS Class AB output stage. What are the advantages of using CMOS technology?	5M	CO4	BTL3
	b	With neat diagram explain Push Pull Class B Power Amplifier and derive its maximum efficiency.	5M	CO4	BTL3
		OR			
9	a	Describe the structure and working of MOS Power Transistors. Compare with power BJTs in terms of speed, power handling, and applications.	10M	CO4	BTL3
		UNIT-V			
10	a	Design a single tuned amplifier for following specifications: 1. Centre frequency = 500 kHz 2. Bandwidth = 10 kHz, Assume transistor parameters: g_m = 0.04 S, h_{fe} = 100, C_{be} = 1000 pF and $C_{b,c}$ = 100 pF. The bias network and the input resistance are adjusted so that ri = 4 kΩ and R_L = 510Ω	10M	CO5	BTL4
		OR			
11	a	Design and explain about Bistable multivibrator	10M	CO5	BTL4

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SET-2

CODE: A1EC403 | **R23** | **H.T.No:**

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

B.Tech II Year II Semester Regular Examinations May 2025

Subject Name: **EM WAVES AND TRANSMISSION LINES**

Branch: ECE

Time: 3 Hours **Max. Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	List out the applications of Gauss' law.	2M	CO1	Understand
	b	Convert point P(2,3,3) into Cylindrical coordinate system.	2M	CO1	Applying
	c	State Biot-Savart's law.	2M	CO2	Remember
	d	Explain right hand thumb rule in finding direction of magnetic field in a current carrying conductor.	2M	CO2	Remember
	e	What is the value of intrinsic impedance η for free space?	2M	CO3	Understand
	f	Differentiate reflection and refraction of a uniform plane wave.	2M	CO4	Remember
	g	Draw the equivalent circuit of the transmission line.	2M	CO5	Remember
	h	Define wave length and phase velocity on a line.	2M	CO5	Remember
	i	Define VSWR of a transmission line.	2M	CO5	Remember
	j	Write expression for input impedance of a lossless line.	2M	CO5	Remember
PART-B					
UNIT-I					
2	a	Illustrate with neat sketches, how to represent a point P in cartesian, cylindrical and spherical coordinate systems? Express point P(1,3,5) in cylindrical & spherical coordinates.	5M	CO1	Creating
	b	Calculate the capacitance per unit length of a Coaxial capacitor with inner and outer radii 0.5mm and 4mm respectively and with a dielectric of ε_r=5. Derive the relation used.	5M	CO1	Applying
OR					
3	a	Calculate the electric field at a height of 'h' meters due to a charged circular ring with charge density ρ_l c/m lying in z=0 plane.	5M	CO1	Applying
	b	Explain conduction current and derive an expression for conduction current density.	5M	CO1	Evaluating
UNIT-II					
4	a	Discuss Faraday's law with neat sketches, derive the Maxwell's equation relating to it?	5M	CO2	Understand
	b	Explain the Ampere's circuit law and derive the Maxwell's equation relating to it?	5M	CO2	Evaluating
OR					
5	a	Explain the line, surface and volume current elements and write expressions for **H** due to them.	5M	CO2	Evaluating
	b	Develop the electric boundary conditions at the surface of discontinuity between two dielectrics.	5M	CO2	Creating
UNIT-III					
6	a	Obtain the solution of wave equation for **E** of a uniform plane wave in free space.	5M	CO3	Understand

	b	Explain the reflection of uniform plane waves by a perfect conductor in the case of normal incidence.	5M	CO3	Evaluating
		OR			
7	a	Derive the wave equation for magnetic fields in free space.	5M	CO3	Understand
	b	Find attenuation constant, phase shift constant and intrinsic impedance for ferrite at 10GHz, for ferrite ϵ_r=9, μ_r=4, conductivity=10 mS/m.	5M	CO3	Understand
		UNIT-IV			
8	a	Derive transmission line equations for voltage and current in terms of source and load parameters.	5M	CO4	Understand
	b	At 6 MHz, Z_0 of a transmission line is (30-j2)Ω and the γ is (0.04+j0.16)/m. Find the primary constants of the line.	5M	CO4	Remember
		OR			
9	a	A Telephone line has R=30Ω/km, L=100mH/km, G=0, C=20μF/km. At f=1 kHz, obtain (i) characteristic impedance (ii) propagation constant (iii) phase velocity	5M	CO4	Understand
	b	Define the group velocity and phase velocity on a transmission line. Obtain the relation between them.	5M	CO4	Remember
		UNIT-V			
10	a	Calculate the input impedance of a lossless line terminated with i) Z_L=0 ii) Z_L=Z_0 iii) Z_L=∞.	5M	CO5	Understand
	b	What is a Smith chart? Draw a rough sketch of it. What are the uses of Smith chart?	5M	CO5	Remember
		OR			
11	a	Derive the input impedance of a lossless line.	5M	CO5	Understand
	b	What is a stub? Why Shorted stubs are preferred over open circuit stubs and explain speciality of stub matching on a transmission line?	5M	CO5	Understand

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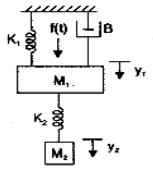
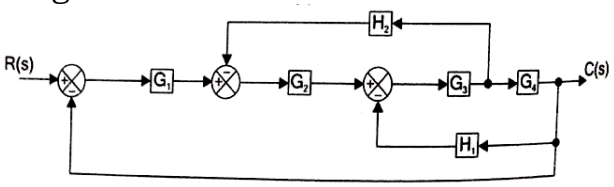
R23	H.T.No:									

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)

B.Tech II Year II Semester Regular Examinations May 2025
Subject Name: **Linear Control Systems**
Branch: ECE

Time: 3 Hours **SET-1** **Max. Marks: 70**

Instructions:
1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	What is the effect feedback sensitivity on overall gain of the system	2M	CO1	L1
	b	State the analogous quantities for mechanical translational system and electrical systems in Force-voltage analogy.	2M	CO1	L2
	c	What is steady state error and what are the static error constants?	2M	CO2	L1
	d	What is Damping frequency of oscillations	2M	CO2	L2
	e	Define stability? Give two examples	2M	CO3	L1
	f	What is centroid? How the centroid is calculated?	2M	CO3	L2
	g	Define phase margin.	2M	CO4	L1
	h	What is frequency response?	2M	CO4	L2
	i	Define state and state variable	2M	CO5	L1
	j	What is observability?	2M	CO5	L2
PART-B					
UNIT-I					
2	a	Determine the transfer function $\frac{Y2(s)}{F(s)}$ From the following Mechanical translational system 	5M	CO1	L2
	b	Derive the transfer function of Armature controlled DC Servo motor.	5M	CO1	L3
OR					
3	a	Obtain the transfer function from given below block diagram. 	5M	CO1	L3
	b	Explain the differences between open and closed loop	5M	CO1	L2

		control systems in detail.			
UNIT-II					
4	a	Derive the time response of 1st order system for unit step input.	5M	CO2	L3
	b	Defined and Explain different Time Domain Specifications for second order systems	5M	CO2	L2
OR					
5	a	Derive the time response of Under damped 2nd order system for unit step input.	10M	CO2	L3
UNIT-III					
6	a	Using Routh criterion, determine the stability of the system whose characteristic equation is given by; $2s^4 + 5s^3 + 9s^2 + 8s + 5 = 0$	5M	CO3	L3
	b	What are the steps involved in the construction of Root locus? Explain.	5M	CO3	L2
OR					
7		Sketch the root locus of the system whose open loop transfer function is G(s) = $\frac{k}{S(S+2)(S+4)}$ Find the value of K so that the damping ratio of the closed loop system is 0.5	10M	CO3	L4
UNIT-IV					
8		(a) What are frequency domain specifications and explain them in detail? (b) Write the formula for Resonant peak and Resonant frequency for second order system.	5M 5M	CO4	L3
OR					
9	a	Discuss in detail about different compensating techniques	10M	CO4	L4
UNIT-V					
10	a	Obtain the state model for the transfer function of system given by $\frac{Y(s)}{U(s)} = \frac{s^2+3s+4}{s^3+2s^2+3s+2}$.	5M	CO5	L3
	b	How to derive transfer function from state model? Explain.	5M	CO5	L2
OR					
11	a	Diagonalize the system matrix given below $\begin{pmatrix} 0 & 1 & -1 \\ -6 & -11 & 6 \\ -6 & -11 & 5 \end{pmatrix}$	5M	CO5	L2
	b	Determine the following system is completely controllable and observable? $\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 3 & -5 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u; y = [1 \quad -1] \begin{bmatrix} X_1 \\ X_2 \end{bmatrix}$	5M	CO5	L3

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CODE: A1HS401a	R23	H.T.No:										

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)

SET-1

B.Tech II Year II Semester Regular Examinations May 2025

Subject Name: Managerial Economics and Financial Analysis

Branch: ECE

Time: 3 Hours **Max. Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	Explain the demand function?	2M	CO1	BTL2
	b	What are the factors influencing demand?	2M	CO1	BTL1
	c	What is the concept of Break-Even analysis?	2M	CO2	BTL1
	d	Explain the concept of production function?	2M	CO2	BTL2
	e	Explain the pricing methods?	2M	CO3	BTL2
	f	Explain the features of sole-proprietary business?	2M	CO3	BTL2
	g	What is Accounting rate of return?	2M	CO4	BTL1
	h	List and explain the components of working capital?	2M	CO4	BTL1
	i	What do you understand by double entry book keeping?	2M	CO5	BTL1
	j	Explain about liquidity ratio?	2M	CO5	BTL2
PART-B					
UNIT-I					
2	a	Define Managerial Economics. Explain how managerial economics is linked with other disciplines.	5M	CO1	BTL1
	b	What is the Law of Demand? What are their assumptions and exceptions?	5M	CO1	BTL1
OR					
3	a	What is demand forecasting? Discuss briefly various methods of forecasting.	5M	CO1	BTL1
	b	What is the role of managerial economist in modern business?	5M	CO1	BTL1
UNIT-II					
4	a	Analyze different of Internal and External economics of scale?	5M	CO2	BTL4
	b	Explain the cost-out put relationship both in short run and long run?	5M	CO2	BTL2
OR					
5	a	From the following data, you are required to calculate: (i) P/V ratio. (ii) Break-even sales with the help of P/V ratio. (iii) Sales required earning a profit of Rs. 4, 50,000. Fixed expenses = Rs 90,000 Variable cost per unit: Direct material = Rs 5 Direct labour= Rs 2 Direct Overheads = 100% of direct labour Selling Price per unit = Rs. 12.	10M	CO2	BTL4
UNIT-III					
6	a	Explain the features, advantages and disadvantages of sole trader?	5M	CO3	BTL2
	b	Explain different types of markets?	5M	CO3	BTL2
OR					

<table>
<tr><td>7</td><td>a</td><td>Explain the pricing methods?</td><td>5M</td><td>CO3</td><td>BTL2</td></tr>
<tr><td></td><td>b</td><td>What are the features of monopolistic competition? How can a firm attain equilibrium position?</td><td>5M</td><td>CO3</td><td>BTL1</td></tr>
<tr><td colspan="6">UNIT-IV</td></tr>
<tr><td>8</td><td>a</td><td>Explain the briefly about various types of capital budgeting techniques?</td><td>5M</td><td>CO4</td><td>BTL2</td></tr>
<tr><td></td><td>b</td><td>What is the procedure for calculating the Net Present Value? What are its advantages and disadvantages?</td><td>5M</td><td>CO4</td><td>BTL1</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>9</td><td>a</td><td>Solve the following problem and Compute NPV of the project. A project needs an Investment of Rs 15000/-, discount rate is 12%. The project is generating net cash inflows Rs 6000, Rs 5000, Rs 4500 and Rs 8000.</td><td>5M</td><td>CO4</td><td>BTL6</td></tr>
<tr><td></td><td>b</td><td>What are the factors influencing working capital of a firm?</td><td>5M</td><td>CO4</td><td>BTL1</td></tr>
<tr><td colspan="6">UNIT-V</td></tr>
<tr><td>10</td><td>a</td><td>Explain the accounting concepts and conventions?</td><td>5M</td><td>CO5</td><td>BTL2</td></tr>
<tr><td></td><td>b</td><td>Explain advantages of financial statements?</td><td>5M</td><td>CO5</td><td>BTL2</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>11</td><td>a</td><td>The following trial balance has been extracted from the books of Mr. Bhaskar on 31.03.2003.
Trial balance
<table>
<tr><th>Particulars</th><th>Debit (Rs.)</th><th>Credit (Rs)</th></tr>
<tr><td>Machinery</td><td>40,000</td><td></td></tr>
<tr><td>Cash at bank</td><td>10,000</td><td></td></tr>
<tr><td>Cash in hand</td><td>5,000</td><td></td></tr>
<tr><td>Wages</td><td>10,000</td><td></td></tr>
<tr><td>Purchases</td><td>80,000</td><td></td></tr>
<tr><td>Stock (01.04.2002)</td><td>60,000</td><td></td></tr>
<tr><td>Sundry debtors</td><td>40,000</td><td></td></tr>
<tr><td>Bills debtors</td><td>29,000</td><td></td></tr>
<tr><td>Rent</td><td>4,000</td><td></td></tr>
<tr><td>Interest on bank loan</td><td>500</td><td></td></tr>
<tr><td>Commission received</td><td></td><td>3,000</td></tr>
<tr><td>General expenses</td><td>12,000</td><td></td></tr>
<tr><td>Salaries</td><td>7,500</td><td></td></tr>
<tr><td>Discount received</td><td></td><td>4,000</td></tr>
<tr><td>Capital</td><td></td><td>90,000</td></tr>
<tr><td>Sales</td><td></td><td>1,20,000</td></tr>
<tr><td>Bank loan</td><td></td><td>40,000</td></tr>
<tr><td>Sundry creditors</td><td></td><td>40,000</td></tr>
<tr><td>Purchase return</td><td></td><td>5,000</td></tr>
<tr><td>sales return</td><td></td><td>4,000</td></tr>
</table>
Adjustments:
(i) Closing stock = Rs. 80,000.
(ii) Interest on bank loan not yet paid = Rs. 400.
(iii) Commission received in advance = Rs. 1,000.
Prepare final account for the year ended 31.03.2003</td><td>10M</td><td>CO5</td><td>BTL4</td></tr>
</table>